

REMARKS

Consideration of the above-identified application, in view of the above amendments and the following remarks, is respectfully requested.

Claims 1-2, 4- 6, 8-9 and 10-19 remain in this application. Claims 3 and 7 have been canceled. Claims 10-12 have been withdrawn, though Applicant retains the right to present claims 10-12 in a divisional application. Claims 1, 4-5 and 8-9 are currently amended. New claims 13-19 have been added. Claims 1 and 5 have been amended to include the limitations that (1) the carbonaceous hollow nanotube comprises at least one transition metal atom and (2) that the nanotube is annular. Support for the transition metal limitation is found at page 9, lines 2-4 and original claim 3. Support for the annular limitation is found at page 4 lines 9 - 11. A tube having a "hollow part" and a "thickness part" is annular or ring-like.

Claims 4 and 8-9 have been amended to reflect the change in their dependencies.

Support for new claims 13 and 16 is found at page 9, lines 6-9. Support for new claim 14 is found at original claim 2. Support for new claim 15 is found at original claim 4. Support for new claim 17 is found at original claim 6. Support for new claim 18 is found at original claim 8. Support for new claim 19 is found at original claim 9.

Rejections Under 35 U.S.C. § 102(b)

Claims 1 - 9 stand rejected under 35 U.S.C. 102(b) as being anticipated by Jose-Yacaman et al., Appl. Phys. Lett. 1993 (hereinafter "Jose-Yacaman") with Ohta et al., U.S.

Patent No. 5,489,477 (hereinafter "Ohta"), and Nolan et al., U.S. Patent No. 5,965,267 (hereinafter "Nolan") cited for inherent properties. The Examiner states that Jose-Yacaman discloses carbon nanotubes of rolled graphitic planes, which are compared to the Iijima Nature (1991) product. The Examiner also states that the fiber of Jose-Yacaman contains hydrogen based on the disclosure of Nolan. The Examiner acknowledges that the nanotubes of Jose-Yacaman are spiral.

Claims 1 - 2 stand rejected under 35 U.S.C. 102(b) as being anticipated by Ohta with Nolan cited for inherent properties. The Examiner states that Ohta discloses generally cylindrical structures, which have a diameter within the claimed range based on C-C bond lengths. The Examiner states that Nolan discloses that hydrogen is inherently present in such structures.

Claims 1 - 9 stand rejected under 35 U.S.C. 102(b) as being anticipated by Endo et al., J. Phys. Chem. Solids 1993;54(12):1841-1848 (hereinafter "Endo"). The Examiner states that Endo discloses a hollow nanotube having the claimed diameters; and that this nanotube contains hydrogen based on Nolan. The Examiner also states that Fig. 3 shows aggregates made from an iron catalyst. The Examiner takes official notice that 0.1% hydrogen is a trace impurity amount.

The Applicant respectfully traverses the above rejections by stating that neither Jose-Yacaman nor Ohta teach or suggest all of the claimed elements of the present invention. Jose-Yacaman discloses two types of nanotubes. One type is a rolled graphitic sheet produced by the arc-discharge method. The second type is produced by catalytic methods using acetylene.

Both types of nanotubes disclosed in Jose-Yacaman are spiral tubes. The nanotubes used in Ohta are produced by the arc-discharge method of Iijima and, therefore, are also spiral. Col. 5, ll. 38-50. A spiral tube is not an annular tube. To illustrate, a line may be wound from the innermost region of a spiral to the exterior of the spiral without traversing any of the solid layers comprising the spiral. Such is not the case with an annular structure in which a layer must be traversed to pass from the interior (hollow part) to the exterior of the tube.

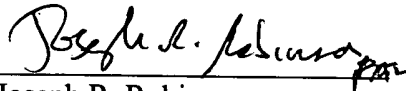
The nanotubes of the present invention are not anticipated by Endo because the Endo tubes do not have at least one transition metal atom. Transition metal atoms are not included in the preparation of the Endo tubes (pyrolytic carbon nanotubes or "PCNTs"). See Endo p. 1841. Endo acknowledges that his PCNTs "are very different from those obtained during the early stages of VGCF [vapor grown carbon fibers] which usually have growth-promoting metal particles...such as iron in the tips." See Endo at page 1842. Figure 3(c) of Endo shows vapor grown carbon fibers (VGCFs) having iron at their tips. The fibers in figure 3(c) are "very different" from the nanotubes produced by the method of Endo. See Endo at pages 1842-1843.

CONCLUSION

In view of the above amendments and remarks, it is respectfully requested that all pending claims be allowed and the case passed to issue.

If there are any other issues remaining which the Examiner believes can be resolved through either a Supplemental Response or a Examiner's Amendment, the Examiner is respectfully requested to contact the undersigned at the telephone number indicated below.

Respectfully submitted,



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